

FACTORS AFFECTING PERSISTENCE IN
EDUCATION AND EMPLOYMENT OF
OCCUPATIONAL THERAPISTS

By

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DEDICATED TO
ALICE C. JANTZEN

An educator who has brought the future to the field
of occupational therapy. An inspiration to those who are
fortunate enough to be touched by her.

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Abstract of Dissertation Presented to the Graduate
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The purpose of this study was to explore independent variables to determine which, if any, could be used to predict success in an occupational therapy curriculum, internship, registry examination, and job persistence prior to the time professional course work is begun for use in student selection. Ultimately the development of a process model which could be used with future data for selection of candidates was a desirable outcome.

The 169 subjects in this study all had been accepted into the occupational therapy program for graduating classes spanning the five year period from 1969 to 1973. Of the 160 women and nine men, 19 withdrew from the undergraduate curriculum. The 25 selected variables occurring prior to professional course work were taken from University of Florida transcripts which were available for all subjects. These

variables were used as probable factors explaining the movement of the dependent variables.

The study was executed in two statistical parts. The first part investigated the best pre-professional course work indicators for scores on the following dependent variables:

1. Psychiatric Internship
2. Physical Disabilities Internship
3. National Registry Examination
4. Work Status Follow-up

Part one of the study was designed to compute a stepwise multiple regression analysis using the Biomedical Computer packaged Programs P Series, BMDP2R.

The second part used stepwise discriminant analysis to find the best indicators of completion and non-completion of the occupational therapy program and the best indicators for work persistence and non-persistence in the field of occupational therapy using Biomedical Computer packaged program, BMDP7M.

The multiple regression analysis of the 25 variables showed five statistically significant at the .05 level: college entry test score, college grade point average for the first two years, transfer student or entry as a University of Florida freshman, number of credit hours in English and literature, and number of credit hours in psychology. The discriminant analysis used all but one of the same variables (CEEB) and added one more: number of credit hours in music. In each case the eight corresponding null hypotheses were rejected.

Although statistically significant variables were revealed, they did not explain a high enough percentage of the movement in the

dependent variables to be useful for practical application. This was demonstrated for each dependent variable by a random sample of subjects' actual data used in each predictive equation. The accuracy of the discriminant analysis was far less than might have occurred by chance.

The results of the study indicated that combining both academic and practical application parameters in both the independent variables and the dependent variables does not enhance the practical use of the predictive selection equation versus using just one of these parameters in both. It was found that the same five variables were statistically significant for both the academic and the practical application dependent variables. Implications of the study were that a few variables could be considered in the selection of potential candidates: college grade-point average for the first two years, transfer student or University of Florida freshman, number of credit hours in English and literature, College Entrance Examination Board Test score, number of credit hours in psychology, and number of credit hours in music. However, human factors and subjective data should also be included. In conclusion, this researcher found that a practical predictive equation cannot be developed with the objective data used in the study.

CHAPTER I

INTRODUCTION

General Background and Statement of Problem

Accountability was a movement of the 70s. The ultimate accountability of an expensive technical education may be measured by statistics showing a high percentage of completion of the program and persistence within the field.

The concepts of predicting persistence and graduation from college have been the substance of many studies, especially in the last ten years. Since a 50 per cent attrition rate of college students prior to graduation represents a great loss of time, money and energy to all concerned (Morgan 1970), there has been a thrust to find ways to decrease this high rate. Predicting professional knowledge, application, and persistence have also been studied. However, combining all these variables, both academic and applied measures, into one study on the same population has rarely been done. This researcher did not find information about such a study that had thus far been completed.

The objective of streamlining the complex process of selecting the best qualified students who will complete oversubscribed programs has been a part of accountability. Selection processes for persistence in working in the field past the first year have not been adequately addressed. To expedite the selection process, to cut valuable faculty

time spent in selection, and to keep prejudices to a minimum, it would be desirable to be able to use information that has been collected and is available on institution transcripts. Most past studies involved administration of additional tests of questionnaires to prospective candidates. If specific objective data from transcripts could be used as valid predictors of completion and persistence in the work field, unskilled office help could do most of the selecting of candidates. Faculty could then be minimally involved making the final decisions concerning the few borderline cases.

In a survey of 39 out of the 40 schools contacted for bachelor's degree occupational therapists in 1974, Johnson, Arbes, and Thompson found that 17 percent of the schools accepted fewer than half of their respective applicants. They also found that:

1. All but three used interviews
2. All used grades in college for the first two years
3. All used aptitude and achievement test scores
4. About half used letters of recommendation
5. Ten used an application letter or essay
6. Seven used a personality or interest inventory
7. All used high school grades
8. Two used a biographical questionnaire
9. One used a lottery

The University of Florida Department of Occupational Therapy annually has 35 openings for students. The Office of the Registrar sends that department approximately 100 applications. The selection procedure is similar to that used by most other occupational therapy

programs. An error in judgment in selecting a student who will later drop out of a program or field of occupational therapy represents a personal and professional loss of two people: the one who dropped out and the one who missed the original opportunity to take that opening (Morgan, 1970).

How can the best students for the health-related professions be selected? What factors, such as abilities, past experiences, personality attributes, styles of life, and interests, are related to proficiency in a professional world? What information about an individual is associated with or will permit prediction of future competencies in his training and persistence in his health care field? Are specialized programs training students who will remain in that work force? With the large numbers of applicants, one knows that many are not qualified academically or personally. However, a significant number are. How then does one objectify in part or in toto this process in order to select those most suitable?

Historically the public wants the best health service available regardless of the expense. Encouraged by the mass media, the public expects services from the health system that it did not know existed prior to the 1970s. People of the 70s began demanding a drastic increase in health service, including comprehensive health care for all. Health care delivery system became a catch phrase with a powerful impact. Mase, as reported by Brown (1972), stated that health care was the second largest industry in the United States. This demand for care precipitated a drain on the health system and created a need for additional allied health manpower to provide support services for physicians and dentists

in the health care delivery system. DuVal reported some 34,000 graduates of allied health educational programs in 1971, compared with about 6,000 in 1960. The development of health manpower has meaning, not only to society, but to education and the individual (Brown, 1973).

College students have also shown an increased interest in the health care fields. An interest survey by the American Council of Education in the fall of 1972 indicated fulltime freshmen showed 1.2 percent more interest in health care fields than those of the previous year (Lind, 1970:91). The American College Testing (ACT) Center in Iowa shows that for the 1977-78 school year, 17 percent of the high school juniors and seniors tested identified health professions as a chosen field. The number of qualified potential candidates has grown to the point where traditional selection criteria are inadequate for several health fields. Since the health-related curriculum is relatively more expensive than the "academic" curriculum, selecting students who will complete the program and be successful within their chosen health field becomes a major problem.

Private and public funding agencies want to know where, how, and to what effect tax dollars or private dollars are being spent. Cost effectiveness in the health fields is of increasing concern. In addition to financial accountability, funding agencies demand service accountability such as how many trainees actually go to work in their field. How many who enter their field continued to work in that field? Therefore, predictive studies should include job entry and long term persistence in the chosen health field as part of successful selection processes.

This study explored possible combinations of variables, such as undergraduate courses, college entrance examination scores and other transcript data as indicators of students who completed and worked in one health care field--occupational therapy. All of the students in this study graduated from the University of Florida.

General Purpose and Need for the Study

A need exists to objectively identify prospective college students who would be able to complete the requirements for registration in occupational therapy, enter the job market and continue within the field of occupational therapy. The purpose of the present study was to explore independent variables such as college entry test scores, courses taken, and grade point averages to determine which, if any, could be used prior to the beginning of professional course work as indicators of those who would be most likely to graduate, then be employed, and continue working in the field of occupational therapy.

Previous studies sought predictors of (1) academic performance, persistence, or withdrawal, (2) performance in practical application of training such as internships, (3) professional knowledge as measured by written tests, (4) short term professional performance and long term persistence. None of these studies included all four variables on the same population. This study sought to generate meaningful results by using variables from each category as they related to a larger number of subjects (n = 169). More specifically the purposes were to

1. Identify the best pre-professional indicators of persistence in working in the field of occupational therapy.

2. Identify the best pre-professional indicators of completion of the program in occupational therapy.
3. Identify the best pre-professional indicators of completion of Physical Disabilities Internship.
4. Identify the best pre-professional indicators of completion of Psychiatric Internship.
5. Identify the best pre-professional indicators of success on passing the National Registry Examination.
6. Identify the best pre-professional indicators of work status in the field of occupational therapy.

Need for the Study

The training of an occupational therapist is expensive in time, money and equipment, encompassing a four-year to five-year educational program. Therefore, the selection and retention of successful students should be studied to help identify criteria for the selection of future applicants for training. Selection of potential occupational therapists has been primarily the domain of educational personnel because career entry has required completion of a formal, accredited educational program. Many areas of student ability and background have been considered as elements of prognosis of success in college and for graduation from college. Methods employed have included extensive use of written applications, recommendations, and personal interviews, consuming great amounts of faculty time. Criteria for selection have emphasized academic achievement, participation in extracurricular activities, and personal qualities.

The "Reports on Curriculum Study" issued in 1963, which reported on the 1958 to 1963 American Occupational Therapy Association study, stated that student selection is considered one of the eight major areas to include in future planning of curricula. Several studies have been conducted on student selection for occupational therapy including those by Bailey et al. (1969), Booth (1957), Crane (1962), Engelhart (1957), Hendrickson (1962), and Lind (1970). However, results have not been uniformly positive (Lind 1970). Negative correlations have resulted within a few. Research on student selection procedures in occupational therapy has been relatively meager and limited in scope. Most of the studies on this topic have been based on small samples ranging from 18 to 37 students (Johnson RW et al. 1974). Sample sizes of at least 100 and preferably 200 students should be obtained from successive classes at the same institution or by the use of comparative data from several institutions (Johnson RW et al. 1974). Pedrini and Pedrini (1974) concluded that there is a need for multivariate research after an extensive review of the literature related to college success. Prendergast (1978) concurred with this need in occupational therapy.

The ultimate impact for change in selection processes will depend on the results of longitudinal research studies which will provide data on the success of applicants in the field (Bistreich 1977). Johnson JA (1974) pinpointed that the education of clinicians who can move with the trends and continue in the field of occupational therapy should be a major emphasis.

In 1977 Morgan stated the need to identify characteristics of effective practitioners:

There is a need to determine if certain characteristics discriminate between those who remain in a field and those who drop out. (p. 72)

The present study was needed to determine if objective factors obtained from records available at the time of selection could be used as criteria to predict the completion of training, entry into, and persistence in the field of occupational therapy.

Assumptions

1. It was assumed that the transcripts of the students involved in this study at the University of Florida were accurate.
2. It was assumed that scores and grades which appeared in the student's personnel file located in the occupational therapy department were accurate.
3. It was assumed that the data received from the American Occupational Therapy Association were accurate.
4. It was assumed that follow-up studies are a practical means of determining strengths and weaknesses of selection processes.
5. It was assumed that academic success is related to occupational success.

Hypotheses

Four generalized, multivariate null hypotheses were proposed for multiple regression analysis:

It will not be possible to predict scores for

(I) the National Registry Examination

(II) Psychiatry internship

(III) Physical disabilities internship

(IV) Work status

on the basis of multiple combinations of variables which include college entry test scores, courses taken, grade point averages, and other objective data taken from transcripts.

Four generalized, multivariate null hypotheses were proposed for discriminant analysis:

It will not be possible to discriminate among groups of students (V) those who completed and (VI) those who did not complete the occupational therapy program on the basis of linear combinations of variables which include college entry test scores, courses taken, grade point averages, and other objective data taken from transcripts.

It will not be possible to discriminate among groups of students (VII) those who were working and (VIII) those who were not working in the field of occupational therapy four to eight years later on the basis of linear combinations of variables which include college entry test scores, courses taken, grade point averages, and other objective data taken from transcripts.

Limitations of the Study

1. This study was limited to obtaining, organizing and presenting data of students who graduated from the University of Florida in the Occupational Therapy curriculum from 1969 to 1973. During this period the course training and faculty from year to year were stable. Subsequent to 1973, there were major changes in the faculty and curriculum.

2. This study was concerned with 169 students' records, including 9 men and 160 women.
3. The students represented various environmental and educational backgrounds. However, the only minority group represented was of Spanish surnames ($n = 3$).
4. This study was not intended to determine the effect that the different student backgrounds had upon individuals in the study group. Nor was it intended that particular school systems should be compared to one another as reflected by the achievement of their graduates. Rather, the purpose was to review, as objectively as possible, a group of students in an effort to determine which of those would have difficulty in the pursuit of a specific college program.
5. No attempt was made to evaluate the content of specific courses.
6. No attempt was made to appraise the teaching methods of individual faculty members.
7. This study did not investigate why students left the curriculum.

Definition of Terms

The following is a list of terms to be defined as used within the text of this study.

1. ACT--American College Test for scholastic aptitude.
2. AOTA--American Occupational Therapy Association.
3. CEEB--College Entrance Examination Board. The sponsoring body for the Scholastic Aptitude Test (SAT).
3. Complete the occupational therapy program--to complete all under-

graduate training plus internships and the National Registry examination to be eligible for Registry in AOTA.

5. GPA--Grade Point Average. The average is computed by dividing the total number of grade points by the total number of course credit hours attempted.
6. Non-persistence in working in the field of occupational therapy--not working in the field of occupational therapy four to eight years after graduation.
7. Persistence in working in the field of occupational therapy--working in the field of occupational therapy four to eight years after graduation.
8. Physical Disabilities Internship--a three-month supervised on-the-job training and learning situation approved by AOTA. This internship is required as partial fulfillment for completion of the occupational therapy program prior to the National Registry Examination.
9. Psychiatric Internship--a three-month supervised on-the-job training and learning situation approved by AOTA. This internship is required as partial fulfillment for completion of the occupational therapy program prior to the National Registry Examination.

Significance of the Study

With the contemporary emphasis on accountability, all schools are being asked to justify their continuation based upon their purpose, methods of achieving that purpose, and allocation of money, personnel and equipment, thereby scrutinizing priorities and responsibilities to

the individual and society. A faculty could benefit from being able to select students who would continue to work in their field of training.

A persistent effort is needed in the departments of all health related professions to eliminate any waste of time, money and resources among students who plan to enter health field training or further their present training. Through the 1970s, few longitudinal studies have been done which followed subjects through college and into their work experiences.

The writer recognizes the differences among various institutions and curricula, but the individuals and conditions involved in the Department of Occupational Therapy at the University of Florida may represent the entire field. The University of Florida accommodates some 30,000 students in all phases of university education. The Department of Occupational Therapy serves approximately 100 occupational therapy undergraduate majors per year who are juniors, seniors or interns. The first two years of the occupational therapy program are in liberal arts. The four-and-one-half year undergraduate program leads to the Bachelor of Health Science in occupational therapy. Should the conclusions of this study be desirable for use in another health field or another institution, modification would undoubtedly be needed to suit the unique institutional and curricular characteristics.

Organization of Subsequent Chapters

Chapter II contains a review of the literature concerning completion of training and job success in education, psychology, sociology and allied health fields.

Chapter III describes the manner in which the data were obtained and processed, specifically dealing with the design and mathematical methodology. Chapter IV contains the presentation of these data while Chapter V contains a summary of the results, conclusions, observations and recommendations.

CHAPTER II

REVIEW OF RELATED LITERATURE

The literature related to this study was reviewed within four major categories. They were (1) academic survival, performance, and persistence, (2) performance in practical application of training such as internships, (3) professional knowledge as measured by written tests, and (4) short-term professional performance, and long-term persistence. The studies were all concerned with specific training curricula at the junior college, college, and graduate levels of higher education, psychology, sociology, and allied health.

Academic Performance, Persistence, or Withdrawal

The literature abounds with studies seeking predictors of college performance, persistence, or withdrawal. Some notable ones by Aiken (1968), A'Hearn (1974), Bowers and Loeb (1972), Green (1962), and Hinkle and Houston (1977) all found that the best predictors of future academic achievement were previous achievement and intellectual characteristics, meaning: high school rank, American College Testing (ACT) and Scholastic Aptitude Testing (SAT) test scores, reading test scores, and Adjective Check List scores. Their focus was toward first semester or first quarter college grades.

In studying persistence and withdrawal of students at the end of the freshman year of college Humphreys et al. (1973), Knopf (1972), Knauer

(1968), and Reed et al. (1972) concurred that lower ACT scores and lower high school rank were more closely related to withdrawal than higher rank and scores. Less than 30 per cent of the lower scoring group stayed to the second semester of the junior year (Humphreys et al. 1973).

Hall and Coates (1973), Pedrini and Pedrini (1974), and Pfeifer and Sedlacek (1974) stated again that high school achievement and aptitude test scores predicted first year college performance for racial minority groups about the same as for whites. Bistreich (1977) found overall high school grade point average (GPA) and high school GPA in science and English were significant predictors of junior college GPA. Inkenberry (1961) tried to predict first year college persistence using noncognitive variables and intellectual functions. He also found that the intellectual function was the most significant variable with a part of the cultural area: sex and social background.

Brazziel (1977) and Chase and Johnson (1977) both found high school rank to be a statistically significant predictor of success in college through the second year. They found two other significant variables: hours of high school English and level of family income.

Within specific technical curricula, R. Brown and Stones (1972) found no close association between intelligence factors and withdrawal rates in the first year of nurses' training. Davies and Khosla (1974) studied health visitor students using intelligence test scores as a predictive tool for those who performed at high levels in academics. Their multiple correlation was $R = .52$.

Reed et al. (1973) found some noncognitive variables to be significant predictors of first year success of nursing students: age, year

of entry into the program, level of previous education, and schools attended. Stress and satisfaction of first year nursing students were assessed by a questionnaire developed by Katzell (1968). Statistically significant negative correlations were shown between withdrawal and experienced satisfaction and expectations. First semester grade point average in a physical therapy program was best predicted by the Educational Interest Inventory Fine Arts Scale and the score of the Attitude Toward Disabled Persons Scale (ATDPS) (Buca 1967). In a study by Schimpfhauser and Broski (1976) of first year academic success in a health related professions program the ACT score was found to be the best predictor. Lowenthal et al. (1977) found that the Pharmacy College Admission Test (PCAT) accounted for 25 per cent of the variation in completion of a pharmacy curriculum. However, Liao and Adams (1977) found that prepharmacy academic performance was the best predictor of first year pharmacy GPA, not the PCAT. Shalik (1978) presented a convincing study showing no statistical difference between the usual selection process for a physical therapy program and a stratified sampling process for student selection.

Specific engineering course grades and GPA were best predicted by the Achievement and Affiliation scales of the Edwards Personal Preference Schedule (EPPS) and the scores on American Council on Education Psychological Examination (Muchinsky 1973).

In studying transfer students, Nickens (1972) stated that junior college GPA was the best predictor of first term Florida State University GPA.

Baker (1975), Bailey (1968), Bean (1975), Holmstrom (1975), and Lee and Shepard (1973) conducted descriptive studies of students who were persistors and withdrawals of programs in health related fields. The persistors and graduates were generally better adjusted, more independent, self-confident, responsible, and intelligent than those who withdrew.

Prediger (1965), Reavley and Wilson (1972), and Rose (1965) found that counseling served as a deterrent to freshman withdrawals. However, Prediger found that the past achievement dimension made the most difference.

Morgan (1970) used Omnibus Personality Inventory factors and ACT scores to discriminate between groups for persistence in college seven semesters after beginning. Her results showed that students differed by sex in personality configurations, ability, and college persistence. However, the best predictive variables for classifying the students into groups were ACT scores, followed by an authoritarianism measure. Aldag and Martin (1975), Cypres (1969), and Wittmeyer et al. (1971) concurred that ACT scores differentiated the students who completed the college curriculum and those who withdrew. Cypres suggested that high school class rank should also be a part of a selection process. In addition, Wittmeyer et al. found that students who completed the program tended to be less independent and less venturesome as measured by the 16 Personality Factor Indicator (PFI) and the Myers-Briggs Type Indicator. Johnson (1970) used the 16 PFI, Strong Vocational Interest Blank (SVIB), and a college qualification test to predict nursing theory and practice grades. His results showed that abstract reasoning ability was the best predictor. Completion of a teacher training program was studied by

Belcastro (1975) in which he used the Edwards Personal Preference Schedule (EPPS) and the SVIB. The Autonomy Scale of the EPPS and the Architect Scale of the SVIB ranked second and third, respectively. In first place was the students' GPA. One- to four-year success in a health education program was again determined to be best predicted by GPA by Heit et al. (1978). Success in graduating from a three year pharmacy program was also predicted by prepharmacy GPA (Palmieri 1976).

Burgess (1972), Lewis and Welch (1975), and Owen and Feldhusen (1970) found that prenursing GPA was the best indicator of nursing course grade point average.

Crane (1962) and Levitt et al. (1971) both showed that the Kuder Preference Record and the EPPS as statistically significant in predicting students who would complete an occupational therapy program and a nursing program, respectively.

Graduate school success as measured by the graduate level GPA was studied by Bean and Covert (1973), Feldman (1976), Federici and Schuerger (1974), R. Stein and Green (1970) and Willingham (1974). The best variable in all of these studies was the Graduate Record Examination scores. Clapp (1975), Gough and Hall (1975), Richards et al. (1974), and Roemer (1965) agreed that the Medical College Admission Test (MCAT) was a significant predictor of medical school success (GPA). They also found that premedical GPA and science GPA were significant. Predental GPA was the most significant predictor of junior year dental GPA (Chen et al. 1967). Halfter's (1966) study showed that the Law School Admissions Test (LSAT) score predicted first year law school GPA somewhat better than the undergraduate GPA did.

Neely (1977) showed high school GPA and the ACT scores were most consistently associated with post graduate work. However, Stein et al. (1974) showed that overall performance of first year social work students evaluated by faculty at the end of the year could be predicted from students' attitudinal ratings done at the beginning of the year.

In summary, most of these studies found that academic achievement at the college or graduate level could best be predicted by previous performance either on achievement tests or with GPAs. The results, though often statistically significant, were not sufficient for practical application toward the selection of students into various curricula, as supported by Hall and Coates' (1972) review of studies completed between 1950 and 1968. His review stated that no reliable variables have emerged to be of general value in the selection of nurses.

Practical Application

Lind (1970) predicted clinical practice grades of occupational therapy students with college GPA. Tidd and Conine (1974) studied the GPA of physical therapy students and found that academically better students also tended to perform better in the clinic than did their peers. Englehart (1957) showed that on-the-job performance during clinical training of occupational therapy students may be predicted from performance in some required college courses but other courses do not predict clinical performance. Duntzman (1966) was not able to predict clinical ratings from freshman and sophomore course performance. Bailey et al. (1969) found that the Interest Test was the most effective predictor of clinical performance of occupational therapy students.

Blume (1976) correlated success in a medical technology internship with responses on a Biographical Data inventory. Booth (1957) showed significant correlations between pediatric internship of occupational therapy students and the T score of Guilford's STDCR Inventory and the Literary Interest scale of the Kuder Preference Record, although the latter was a negative correlation. The C score of STDCR correlated with grades from a tuberculosis internship and the total internship grade was linked with the persuasive interest scale of the Kuder Preference Record.

Osipow and Walsh (1973) conducted two studies that indicated tests of social intelligence were useful in predicting a desired facet of performance of counselor trainees in counseling psychology. McClain (1968) found that the 16 PFI test was more useful for both men and women in identifying the superior counselors than in differentiating the average from the poor. Gough (1978) stated that high premedical science competence and performance was unrelated to clinical performance and faculty ratings of clinical competence. Munro (1964) decided that the Minnesota Teacher Attitude Inventory was an inadequate predictor of teaching performance in internship.

Tests of Professional Knowledge

Ayers and Rohr (1974) and Walberg (1967) attempted to predict scores on the National Teacher Examination (NTE). Ayers found that grades in social science were the best indicators of success on the NTE, while Walberg found that high school GPA and scores on the School and College Ability Test (SCAT) were the best indicators.

High school performance and standardized achievement tests were the best predictors of scores on nursing State Board Tests (Haglund 1975, Tatham 1976, and Weber et al. 1973). Larken (1976) found that scores on the comparative Guidance and Placement Tests (CGP) taken at entry to a nursing curriculum appeared to discriminate between State Board Test passes and failures. Brandt et al. (1966) showed a lack of relationship between grades in nursing theory courses and scores on State Board Tests.

A low correlation between the occupational therapy National Registry Examination score and Guilford's STDCR Inventory--R Factor was revealed by Booth (1957). Engelhart (1957) found that some grades in specific courses predict occupational therapy Registry Examination scores.

Fredricks et al. (1970) investigated the relationship between medical students' performance on the National Board Examinations and their performance on the MCAT and their academic achievement over the four years of medical school. The most effective predictor for performance on the National Board Examination was the GPA from the second year of medical school.

Bergman et al. (1974) conducted a comprehensive study in Israel on 589 nursing students. They found psychological tests correlated significantly with achievement in theoretical learning. Personality factors were studied by Krall (1970) in relation to nursing success and failure. The Interpretation of a Draw-A-Person Test and scores from the National League of Nursing (NLN) test were used to compare successful and failed students. The NLN test was found to be significantly related to nursing school withdrawal in the first year for those who did not leave

for "personal reasons." Unsuccessful students produced more imcomplete figures and drew the opposite sex first significantly more often than did successful students.

Professional Performance and Persistence

Brandt (1967), Burton (1972), and Dubs (1975) studied the records of nurses within one year of graduation. Brandt found that 79% of them were working but no predictor variables were statistically significant. Burton revealed that the 16 PF indicator predicted the performance of new nurses slightly better than chance. Dubs used curriculum objectives to develop an employer rating scale and then compared the results with grades to see if the curriculum was doing what it was designed to do. May and Chitty (1971) used the progressive matrices and Mill Hill Vocabulary Test in their study of new state enrolled nurses in their first jobs. They concluded that the tests could be used only as a means of obtaining more intelligent student nurses, not for competent state enrolled nurses. Di Marco and Hilliard (1978) decided there was no conclusive evidence that associate, diploma, and baccalaureate degree nurses were either the same or different in terms of the professional performance variables measured.

Several studies have found negative results. A one year follow-up study of clerical workers by Schmidt (1975) showed that the low ability group was more satisfied rather than the middle or high groups.

Cornett (1969) studied the effectiveness of GPA and grades in two classes in predicting performance of first year teachers on the job. The best single predictor for secondary teaching performance was college

GPA; however, this correlation was very low. McGreevy (1967) found the Miller Analogies Test did an "acceptable" job of identifying academically talented people.

In physical therapy, Walker (1959) found no factor to be a significant predictor of graduation and entrance into the profession from grades and achievement measures. Anderson and Jantzen (1965) agreed that grades and achievement measures were ineffective predictors of clinical performance in another health field, occupational therapy. Muthard et al. (1976) did a short term follow-up on occupational therapy graduates. They failed to show that the registry examination and internship scores had predictive validity for specific indices of first year job success.

Long-term follow-up in the health fields has been limited. The studies that have been done were more descriptive than predictive.

Hendrickson (1962) and Brown and Stones (1972) described occupational therapy personality characteristics and job satisfaction. Broliier (1970) expanded her description to include not only occupational therapists, but physical therapists and social workers in a small sample of each. The differences appeared to be related to the different job concerns of the social psychiatric group versus the physical disabilities group.

Sussman and Haug (1968) and Jantzen (1972) described the typical person in their respective fields. The implication is that such data could possibly be used for recruitment and selection of future students who would be most likely to succeed in a career of these health related fields.

Drugo (1975), Maynard et al. (1972), Nelson (1975), Thom and Hickcox (1975) and Tucker and Strong (1962) carried out predictive studies. Drugo

found no significant correlations between GPA, internship scores, and employer ratings of physical therapists' one-year job success. A seven year study by Maynard et al. (1972) revealed a small, but significant, relationship between job performance and practical experience grades. Nelson (1975) concluded from an extensive review of the literature of education, health, psychology, social science, and business that GPAs from college are of little use in predicting later occupational success. Tucker (1962) did a ten-year follow-up of medical students and found that interest scales did not measure distinctions between the medical specialty areas. Ginsberg concluded that college performance had no differential significance for later performance; however, outstanding grades in graduate school did indicate later superior performance (Nelson 1975).

Thom and Hickcox (1975) did a different approach to prediction of career success. He had faculty, students and principals predict on the basis of file information for six students whether the students would do well in academics and careers. The actual achievements of the students were known to the researchers. He found that there was no difference in selection accuracy. They were approximately 60 percent correct for academic success but only 50 percent for job success. Transcripts and letters of recommendations were the most useful for selection of achievers.

Concluding Remarks

Most of the studies reviewed suggested that previous intellectual functions such as academic achievement and standardized test scores for

achievement were the best predictors of later academic achievement and of higher scores on written tests of professional knowledge. Many studies required the administration of additional tests and questionnaires. Occasionally scores on psychological and interest measures were significant. None of the predictive variables were considered by the respective researcher to be adequate as a single variable when selecting students for a specific curriculum. Only one study used both academic and practical application data in both independent and dependent variables; however, that study did not follow up the same population for entry and persistence in the specific field. Relatively few studies dealt with long-term follow-up.

A study of the literature revealed no study combining all of the following:

1. practical application data in the dependent and independent variables.
2. academic data in the dependent and independent variables.
3. a sample size larger than 50.
4. data on subjects for more than three successive years.
5. followup on the same subjects more than one year after graduation.
6. followup on the subjects who withdrew from the undergraduate curriculum.
7. use of only objective data from transcripts.

CHAPTER III

DESIGN AND METHODOLOGY

The purpose of this study was to explore independent variables to determine which, if any, could be used to predict success in an occupational therapy curriculum, internship, registry examination, and job persistence prior to the time professional course work is begun for use in student selection. Ultimately the development of a process model which could be used with future data for selection of candidates was a desirable outcome.

This chapter contains an explanation of the procedures used in this study. Initially, the population and selection of the sample are described, followed by a description of the data collection procedures. Subsequently, the method of analysis (including definitions of statistical terms) and the pitfalls of interpreting regression analysis are discussed. The concluding section contains a description of how the data are organized.

Population

The undergraduate occupational therapy curriculum at the University of Florida is within the College of Health Related Professions and served approximately 75 juniors, seniors and interns each year.

The five-year period from 1969 to 1973 was chosen for study because during these years the course of study and the faculty remained quite

stable. After 1973, there were major changes in both the faculty and the curriculum. During this period of time, 9 men and 161 women students were enrolled in the occupational therapy curriculum.

Of the 169 students, 20 dropped out of the program before finishing the undergraduate degree. One student failed on internship and never finished. Three students completed the undergraduate program and both internships but did not make a satisfactory score on the registry examination.

These students were selected for admission to the occupational therapy curriculum based on the following criteria:

Student Requirements:

1. The student must have been an undergraduate student at an accredited college or university.
2. Transfer students at the junior level must have been residents of the State of Florida.
3. Nonresidents must have been enrolled at the University of Florida since the freshman year.
4. Since the program begins only in the fall of each year, all applicants must have completed a minimum of 96 transferable quarter credits and all departmental prerequisites prior to enrollment.
5. The student must have been admitted to the University of Florida.
6. The student must have completed all departmental forms by March 15 of the spring before admission for the following fall. These included

- a. A student information form for the College of Health Related Professions. This was a traditional form similar to a curriculum vitae, including
 - 1) extracurricular activities
 - 2) honors and distinctions
 - 3) employment
 - 4) essay as to why the student was interested in a health career.
- b. Copies of all transcripts must have been received in Occupational Therapy Department via the Registrar's Office.
- c. Student must have completed the form listing student organizations, activities, and publications.

Faculty evaluation commenced after the above steps were completed by the applicant. The selection process considered the following:

1. Grades were important; the faculty scanned credentials of all candidates possessing a 2.0 GPA or better.
2. Pre-professional grades must be 2.0 or better.
3. The essay was read and the following factors were evaluated:
 - a. The student's motivation.
 - b. Why the student was interested in occupational therapy.
 - c. How well the student wrote.
4. Work and volunteer experience were considered.
5. Two interviews were conducted;
 - a. One was as an advisement discussion.
 - b. The second was more formal and was randomly assigned to a different member of the faculty.

6. Each faculty member wrote a summary of impressions of the student.
7. Meeting as a selections committee, the entire faculty discussed each student, finally ranking all in order of preference for admission.

Data Collection

Data collection began with the files in the occupational therapy curriculum office at the University of Florida's J. Hillis Miller Health Center. The social security number was obtained for each student involved in the occupational therapy curriculum that did or would have graduated between 1967 and 1973. These files yielded the scores for three of the dependent variables on each student: National Registry Examination, Psychiatric Internship, and Physical Disabilities Internship. Since some of the Registry Examination scores were never recorded in these records, it was then necessary to consult the computer printout from the American Occupational Therapy Association (AOTA). Many of the scores for the internships had not been coded and computed. The faculty member who had been in charge of this task was consulted. Most of the internship evaluations were found, coded, computed, and recorded. Some scores were obtained by telephone and were not recorded; therefore, they were not available even from the internship institution. This affected five students for the Psychiatric Internship and two students for the Physical Disabilities Internship (see Appendix). One student who is currently registered could not be reached to give permission to AOTA to release her Registry Examination score. An average was computed for all

those who had scores and inserted for the missing scores rather than using a zero to avoid distorting the statistical results (Winer 1962).

The means used were

Psychiatric Internship 255

Physical Disabilities Internship . . . 247

National Registry Examination 172

Permission was obtained from the Registrar's office of the University of Florida to receive copies of transcripts for all students involved in the occupational therapy curriculum for the period from 1967 to 1973. The social security number of each student, including those who dropped out of the curriculum, was used to request these documents. A staff member photocopied each transcript and the data were forwarded to this researcher.

Collection of the data from the individual transcripts was done by the researcher. Fifteen transcripts were selected at random and were reworked several times. Various general categories were set up to accommodate the variations in student course selections. A standardization of categories was finally achieved. For example,

Social sciences: history, anthropology, western civilization

Biological sciences: zoology, biology

Physical sciences: chemistry, physics, geology

Art: studio

Music: appreciation, lessons, choral

Literature: English and literature

College course grades were converted to points: A = 4, B = 3, C = 2 and D = 1. Semester grades were converted to quarter hour credits. The

categories tabulated in grade points were common to all transcripts. Several categories were recorded in number of credits taken which might indicate a proficiency and/or interest in an area.

When this study was initiated, 76 variables from the transcripts were considered. However, many observations were deleted because they were represented by only one or two students. Other variables were deleted after an initial stepwise multiple regression analysis showed that they entered the equation very late, were not statistically significant, and accounted for a miniscule amount of movement of the dependent variables. Only 24 variables which were represented by at least eight per cent of the students were used in the final analysis. These 24 variables were then keypunched according to the Biomedical Computer Program P-Series and analyzed by the University of Montana computer.

Ten transcripts did not have a score for the Florida Twelfth Grade Placement Test nor the Scholastic Aptitude Test of the College Entrance Examination Board (CEEB). An average score for all those who had scores was computed and used rather than a zero (Winer 1962). The means used were:

CEEB	1006
Florida 12th Grade Test	384

A table was obtained from the University of Florida Admissions Office to convert the total score for the Florida 12th Grade Test to the equivalent total for the Scholastic Aptitude Test scores of the CEEB.

The American Occupational Therapy Association was contacted concerning follow-up on all subjects who had continued their national

registration. Specific information requested from the 1973 and 1977 member data surveys was forwarded to this researcher (see Appendix). A telephone followup was conducted for all nonrespondents to these surveys. There was no number available for six of these subjects and 17 were successfully reached by telephone.

Telephone followup was also attempted for all 20 subjects who dropped out of the occupational therapy curriculum. No number was available for seven of them. Contact was achieved with 13 of them.

The follow-up data yielded the fourth dependent variable score, work status, for the multiple regression analyses. It also provided the dependent variables, (1) complete/not complete the occupational therapy program and (2) working/not working in the field of occupational therapy, for the discriminant analyses.

Method of Analysis

This study was executed in two statistical parts. The first part encompassed the objectives of finding the best pre-professional indicators for completion of internships and the registry examination in occupational therapy and for working in the field of occupational therapy four to eight years after graduation. The first part was designed to compute a multiple regression analysis using Biomedical Computer Program P-Series (BMPP), stepwise multiple regression analysis (MR).

The second statistical part used stepwise discriminant (DIS) analysis of the Bio-Med package to find the best indicators of work persistence and non-persistence in the field of occupational therapy and completion or non-completion of the occupational therapy program.

The 169 students studied were enrolled in the Occupational Therapy curriculum from 1969 to 1973. For each student these follow-up records were available:

1. University of Florida transcript
2. Internship scores, if the subjects completed the internships
3. National Registry Examination scores for the subjects who took this examination
4. Work-entry statement from departmental follow-up newsletter
5. Follow-up information from the AOTA of those who continued their registry
6. Telephone followup of those subjects who did not respond to the AOTA surveys
7. Telephone followup of those subjects who did not continue their registry in occupational therapy
8. Telephone followup of those subjects who dropped the occupational therapy program before passing the registry examination.

From the 169 University of Florida transcripts examined, 24 independent variables occurred prior to entering professional course work. These independent variables identified as possible factors explaining the movement of the dependent variables are listed below:

1. Florida resident or out-of-state resident
2. University of Florida freshman or transfer
3. Grade in points in Introduction to the Health Related Professions course
4. Gap in years from college freshman to upper division status
5. Number of hours in speech courses

6. Number of hours in business courses
7. Number of hours in nursing courses
8. Number of hours in library science courses
9. Grade in points in growth and development courses
10. Number of hours in special education courses
11. Number of hours in drama and theater courses
12. Number of hours in health courses
13. Number of hours in social sciences courses
14. number of hours in physical sciences courses
15. Number of hours in biological sciences courses
16. Number of hours in English and literature courses
17. Number of hours in mathematics courses
18. Number of hours in psychology courses
19. Number of hours in foreign language courses
20. Number of hours in arts and crafts courses
21. Number of hours in music
22. Grade point average for the first two years
23. Florida 12th Grade Placement Test total score
24. College Entrance Examination Board total test score

The dependent variables established for this study were:

1. American Occupational Therapy Association National Registry Examination score
2. Psychiatric Internship score
3. Physical Disabilities Internship score
4. Work status at the time of this study
5. Completion of non-completion of the occupational therapy program

6. Working or not working in the field of occupational therapy at the time of this study.

A scale employing the numbers zero through ten was developed to describe different levels of work status (see Table 1). The least desirable level, indicated by a zero, represented no available followup on those who did not complete the undergraduate curriculum in occupational therapy. The number ten represented the most favorable follow-up information of working full time in the field of occupational therapy.

Table 1
Work Status Scale

Level Number	Description
0	No followup and did not complete the undergraduate curriculum in occupational therapy
1	Did not complete the undergraduate curriculum in occupational therapy and not working
2	Did not complete the undergraduate curriculum in occupational therapy and is working in an unrelated field
3	Did not complete the undergraduate curriculum in occupational therapy and is working in a health related profession
4	No followup data; did complete the undergraduate curriculum in occupational therapy, and recorded as not registered.
5	Did complete the undergraduate curriculum in occupational therapy, not registered, and working in an unrelated field.
6	No followup data and recorded as registered
7	Registered and working in unrelated field
8	Registered, not presently working but plans to be back to occupational therapy
9	Registered and working parttime in occupational therapy
10	Registered and working fulltime in occupational therapy

A stepwise multiple regression analysis was calculated with the BMDP computer package using the 30 independent and dependent variables. The dependent variable was identified as y, the independent variable as X. The process of narrowing the predictive independent variables to just a few is called variable select. This yields R^2 , which is a coefficient of determination; that is, it yields the percentage of the movement of Y that is being explained by the X(s), or, the percentage of variance in Y due to the regression on X(s).

Discriminant analysis is an extension of multiple regression analysis which allows use of a dependent variable in the form of a positive or negative occurrence. Stepwise discriminant analysis uses a similar process of identifying the best predictor at each step for the dependent variable. It is used to determine correct classification within specific groups, rather than identifying variables which relate to better performance of the dependent variable.

The independent variables were tested for significance at the .05 level of confidence. The hypotheses were then accepted or rejected. A variable was deleted when its F ratio became too low. The "F to enter" in the BMDP package program was 4.0 (given the size of the data set in this problem, and "F to enter" corresponds to a 5 per cent level of significance).

Definitions of Statistical Terms

1. Correlation analysis--the degree to which two variables are related (Lapin 1973).

2. Correlation coefficient--shows how closely two variables move together by means of a single number calculated from the same data.
3. Coefficient of determination--expresses the relative reduction in the variation of Y that can be attributed to knowledge of X and its relationship to Y by way of the regression line or the proportion of the total variation in Y explained by the regression line. Expresses how strongly X is associated with Y. Represented by r^2 or R^2 (Lapin 1973).
4. Dependent variable--the variable whose value is being predicted, represented by the y axis (Lapin 1973).
5. Independent variable--the variable whose value is known, and represented by the X axis (Lapin 1973).
6. Estimated regression line--expresses the average relationship between the X and Y variables. This provides an estimate of the mean level of the dependent variable Y when the value of X is specified. Because the estimated regression line provides estimates only, the symbol is Y_x (Lapin 1973).
7. Simple linear regression analysis--is used to obtain predictions of one variable using known values of another variable. The regression equation looks like this:

$$Y = a + bX$$

Sample observations are taken and used to predict another variable. To avoid a large sampling error, a sample size considerably greater than ten should be used (Lapin 1973).

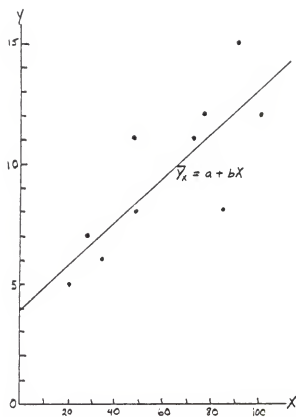


Figure 1. Simple Linear Regression (p. 447)

8. Multiple regression analysis--is an expansion of the same techniques used in simple regression. Multiple regression uses several independent variables as predictors. The movement or variation of Y can then be explained by two or more variables. This formula is:

$$Y_c = a + b_1 X_1 + b_2 X_2 + \dots + b_k X_k$$

This multi-dimensional analysis can be shown by the following figure:

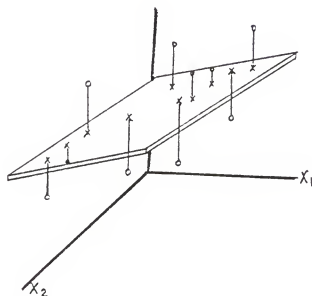


Figure 2. Multiple Regression (p. 500)

An analogy would be, using the walls and floor of a room. The corner represents the point where all three variables have a value of zero. The observation points are represented by marbles suspended in space at various distances from the floor and the two walls. The value of Y is represented by the marble's height above the floor. The observed value for X_1 is represented by

its distance from the wall on the right, while the distance from the left wall represents the value for X_2 (Lapin 1973).

There are no theoretical limits to the number of variables that may be used in multiple regression. Until the recent accessibility to high-speed computers, the higher-dimensional multiple regression was severely limited in scope because of the vast quantity of calculations involved (Lapin 1973). This study would have been practically impossible before the advent of the computer.

9. Discriminant function of two groups--is an expansion of multiple regression. It is illustrated in the following figure:

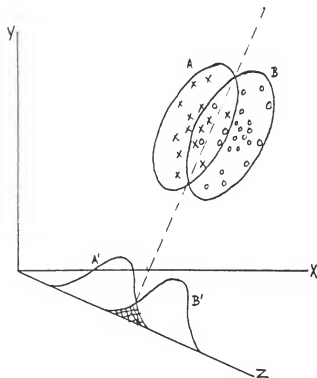


Figure 3. Discriminant Function (p. 370)

With two groups, A and B, and two measurements X and Y, on each member of the two groups, a scatter plot could be done for each group. Then a circle is drawn around the groups, respectively. A straight line is then drawn through the two points where the ellipses intersect and then projected to a new axis, Z. The overlap between the distributions A' and B' is smaller than would be obtained by any other line drawn through the ellipses. The Z axis is the discriminant function in this case. Group averages and mean-square deviations of group values are computed. Then that result is compared to the mean square deviations of the group averages from the overall average. If the latter is large, then the linear function used in these calculations separates the groups well (Green and Tull 1970).

10. Standard error of the estimate--the square root of the mean squared deviations about the regression line or plane. It may be used to estimate the true variability in Y about the model. It directly expresses the degree of scatter in the data (Lapin 1973).

Pitfalls of Regression and Correlation Techniques

When reading a correlation coefficient the reader must remember that it reflects, in numerical value only, the strength of association between variables. This is a statistical relationship; a large positive or negative value for R^2 or r^2 does not indicate a cause and effect relationship. Examples of nonsense or spurious correlations abound. For most practical problems there is usually some reasonable connection. Often a relationship between two variables may be explained by their

interactions with a common factor. Care must be taken in using past data to determine a future relationship. The conditions under which the Y and X data were obtained may have changed over time. Caution should be used when making predictions of Y whenever X falls outside the range of values used in the original collections of data (Lapin 1973).

Organization of the Data

For the purposes of this study the students' data were organized into their respective five classes and arranged alphabetically within each class. The earliest metriculated class was listed first. Each subject was then numbered consecutively, starting with A in the earliest class, 1967. Those who dropped out of the undergraduate curriculum were alphabetized and consecutively numbered at the end of the before mentioned groups.

Summary

This chapter has presented the procedures used in this study. The population and selection of the sample were described followed by data collection procedures and the method of analysis. Definitions of statistical terms used in this study were given. The pitfalls of interpreting regression analysis were briefly discussed and, finally, the organization of the data was presented.

CHAPTER IV

ANALYSIS OF DATA AND RESULTS

Introduction

This chapter was organized around the analysis of data in order to develop a process model. After a discussion of the specific computer programs used in this study the results of the data analysis were presented in six major sections based on six dependent variables. Each dependent variable was shown with its respective prediction equation, significance level of the independent variables, and examples of student performance predictions with comparisons of actual data realized. All data from 169 subjects were used throughout. Stepwise multiple regression analysis was used for predictors of the following dependent variables:

1. National Registry Examination Score
2. Psychiatry Internship Score
3. Physical Disabilities Internship Score
4. Work Status Score

Stepwise discriminant analysis was used for predictors of correctly classifying the subjects into dichotomous groups represented by the following dependent variables:

1. Complete or not complete the program for registry in occupational therapy.

2. Working or not working in the field of occupational therapy.
The last section discusses the process model.

The Computer Programs

The statistical package used for computing the data in this study was the Biomedical Computer Programs known as "BMD." The recent revision of these programs was known as "BMDP" (Dixon and Brown 1979). The BMDP program package, allowing the use of several dependent variables and a large number of independent variables, offered the two programs pertinent to this study: stepwise multiple regression "P2R" and stepwise discriminant analysis "P7M." Both of these analyses used the forward variable select procedure. This was described by Lapin (1973) as a sequence of multiple linear regression equations in a stepwise manner. At each step one variable is added to the regression equation. First, the program selects the independent variable (X_1) which accounts for the most movement in the dependent variable Y. Then the next independent variable is (X_2) added to the model. The program continues in successively higher dimensions until there is insufficient F ratio to enter the regression function. The F ratio for significance of the regression coefficient was set at 4.0. If the statistical criteria were not met, the variable was not entered into the analysis.

Separate regression analysis was done to isolate from a set of 25 predictor variables a subset which would yield an optimal predictive equation with the fewest possible terms to predict each of the four dependent variables (1) National Registry Examination Score, (2) Psychiatry Internship Score, (3) Physical Disabilities Internship Score, and (4) Work Status Score.

Output from stepwise regression analysis (BMDP2R) includes at each step,

1. Multiple R
2. Standard error of estimate
3. Analysis-of-variance table
4. For variables in the equation:
 - a. Regression coefficient
 - b. Standard error
 - c. Tolerance
 - d. $\underline{F}$ to remove
5. For variables not in the equation:
 - a. Tolerance
 - b. Partial correlation coefficient
 - c. $\underline{F}$ to enter

Tiedeman (1951) explained that discriminant analysis determines whether discrimination between groups is possible or not and then reduces the size of the space in which it is necessary to think about regions of classification (Morgan 1970, p. 37). Again, the forward variable select method was employed. At each step one variable was selected from the variables not in the analysis and entered into the set of discriminating variables. The variable selected at each step was the one which provided the greatest improvement in classification between the two groups. A variable was considered for selection only if its partial multivariate $\underline{F}$ ratio was larger than 3.999. Separate stepwise discriminant analysis was done for predictor variables for each of the two dependent variables: (1) complete/not complete, and (2) work/not

work. Output from stepwise discriminant analysis program (BMDP7M) includes at each step:

1. Wilk's Lambda
2. Approximate F statistic
3. Degrees of freedom
4. Constant
5. For variables in the equation:
 - a. F to remove
 - b. Tolerance
6. For variables not in the equation:
 - a. F to enter
 - b. Tolerance

Stepwise Multiple Regression Analysis

Each model has been described through its development at each step. An equation was shown for each step and some examples of using the final equation was shown through the randomly chosen samples.

Model I--National Registry Examination Score (REGIST)

The first step in the model accounted for six percent of the movement or a multiple R^2 of .057. This equation was as follows:

$$Y = a + bX$$

Y = the National Registry Examination Score (REGIST)

a = the constant as computed at each step

b = the coefficient as computed for the independent variable
at each step

X = the independent variable--in this case number 29, total score on CEEB

Therefore, $\text{REGIST} = 67.188 + .084X$

When the second variable was added, X_2 = number 18, number of hours in English and literature (ENGLT), the two yielded a multiple R^2 of .075. The equation for the second step was:

$$Y = a + b_1X_1 + b_2X_2$$

$$\text{REGIST} = 88.733 + .085X_1 - 2.063X_2$$

The model was cut off at the second step because there was insufficient F ratio to continue the stepping process. Table 2 shows the variables entered by step, percent of movement at each step, the overall F ratio at each step. The prediction equation developed by the step wise multiple regression analysis for the score on the National Registry Examination, as shown in step two description, gave statistically significant results but the reader should focus on the fact that

Table 2
Model I--Variables Entered by Step

Dependent Variable	Independent Variable	Variable Number	Percent of Movement at Each Step	Overall <u>F</u>
National Registry Examination (#26)	CEEB	29	.057	10.04
	ENGLT	18	.075	7.84

the model explains only eight percent of the movement in the National Registry Examination scores. That means that 92 percent of the movement in scores were not accounted for.

Null hypothesis I was rejected since it was statistically possible to predict scores on the occupational therapy National Registry Examination on the basis of multiple combinations of the objective variables used in this study. The weakness of the prediction accuracy of Model I is shown in Table 2 using a random sample of subjects' actual scores for examples.

Table 3

Model I--Score Comparison for National Registry
Examination-Actual and Predicted

Subject Number	Actual Registry	CEEB	ENGLT	Predicted Score
007	186	860	08	129.7
051	158	1048	16.6	110.56
111	155	1006	08	157.74
149	174	1100	09	163.67
155	0	1020	28	117.67
165	0	820	32.1	92.21

Model II--Psychiatric Internship Score (PYCHIN)

The first step in the model accounted for five percent of the movement or a multiple R^2 of .053. The first significant variable was number 4, University of Florida freshman or transfer student (TRANS). The equation was:

$$Y = a + bX$$

$$PYCHIN = 241.634 - 39.606X_1$$

The second most significant variable was grade point average of the first two years of college, number 24 (GPA-1). Adding this to the equation brought the multiple R^2 to .095. The equation at this point looked

like this:

$$Y = a + b_1Y_1 + b_2X_2$$

$$PYCHIN = 154,004 - 49.124X_1 + 34.994X_2$$

At the third step the number of hours in English and literature number 18 (ENGLT) brought the movement up to 12 percent. The equation follows:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3$$

$$PYCHIN + 171.749 - 43.864X_1 = 39.128X_2 - 8.813X_3$$

The number of credit hours in psychology, number 20 (PSYCH) was significant at the fourth step giving a multiple R^2 of .146. The predictive equation developed for the score in psychiatric internship was as follows:

$$Y = a + b_1X_2 + b_2X_2 + b_3X_3 + b_4X_4$$

$$PYCHIN = 151.52 - 46.716X_1 - 3.119X_2 + 38.49X_3 + 8.706X_4$$

After this step the F ratio was not sufficient for further stepping (see Table 4). Null hypothesis II was rejected since it was statistically possible to predict scores in psychiatry internship on the basis

Table 4

Model II--Variables Entered by Step

Dependent Variable	Independent Variable	Variable Number	Percent of Movement at Each Step	Overall $\underline{F}$
Psychiatry Internship #27	TRANS	4	.054	9.50
	GPA-1	24	.095	8.74
	ENGLT	18	.120	7.51
	PSYCH	20	.146	7.04

of multiple combinations of objective variables used in this study. Care should be taken in use of this model because only 15 percent of the movement in Psychiatry Internship scores was explained by the statistically significant variables, leaving 85 percent unaccountable. By examining Table 5 for a random sample of this equation in use, one can see that it does not work well in practical application.

Table 5
Model II--Score Comparison for Psychiatric
Internship-Actual and Predicted

Subject Number	Psychiatry Internship Actual Score	TRANS	GPA-1	ENGLT	PSYCH	Predicted Score
007	262	1	2.7	08	16	477.62
051	254	0	1.97	16.6	10	659.85
111	186	1	1.44	08	14	446.137
149	236	0	2.61	09	09	514.35
155	0	0	2.09	28	04	1082.025
165	0	0	3.0	32.1	09.5	1403.419

Model III--Physical Disabilities Internship Score (PDINT)

Variable number 4, University of Florida freshman or transfer student, was the first significant variable with a multiple R^2 of .031. The equation appeared as:

$$Y = a + bX$$

$$PDINT = 231.082 - 30.478X_1$$

The second step included in grade point average of the first two years of college, number 24, raising the R^2 to .077. The model terminated at this step because of insufficient F ratio (see Table 6).

Table 6
Model III--Variables Entered by Step

Dependent Variable	Independent Variable	Variable Number	Percent of Movement at Each Step	Overall <u>F</u>
Physical Disabilities Internship #28	TRANS	4	.032	5.44
	GPA-1	24	.077	6.95

The prediction equation for scores in physical disabilities internship follows:

$$Y = a - b_1X_1 + b_2X_2$$

$$PDINT = 138.714 - 40.511X_1 + 36.877X_2$$

Again the amount of movement accounted for is very small, eight percent. Therefore, the reader should exercise care in interpreting the use of this model. Null hypothesis III was rejected since it was statistically possible to predict scores in physical disabilities internship on the basis of multiple combinations of objective variables used in this study. Table 7 shows this model demonstrated by a random sample of subjects' data.

Model IV--Work Status Score

This model computed only one step which accounted for only three percent of the movement in work status scores (Table 8). The variable of significance was CEEB, number 29. The first and final step showed the following equation:

$$Y = a + bX$$

$$WKSTA = 5.352 - .003X$$

Table 7

Model III--Score Comparison for Physical Disabilities
Internship-Actual and Predicted

Subject Number	Actual Phys. Dis. Internship	TRANS	GPA First Two Years	Predicted Score
007	256	1	2.7	294.97
051	270.5	0	1.97	211.36
111	144	1	1.44	151.306
149	174	0	2.61	235.963
155	0	0	2.09	215.787
165	0	0	3.0	388.059

Table 8

Model IV--Variables Entered by Step

Dependent Variable	Independent Variable	Variable Number	Percent of Movement at Each Step	Overall <u>F</u>
Work Status #31	CEEB	29	.028	4.80

Null hypothesis IV was rejected since it was statistically possible to predict scores in work status on the basis of multiple combinations of the objective variables used in this study. The accuracy in practical application of this prediction equation is very low as shown in Table 9 using a random sample of subjects.

Table 9
Model IV--Score Comparison for Work Status
Actual and Predicted

Subject Number	Actual Work Status	CEEB	Predicted Score for Work Status
007	10	860	7.932
051	10	1048	8.496
111	10	1006	8.370
149	10	1100	8.652
155	3	1020	8.412
165	2	820	7.812

Stepwise Discrimination Analysis

Model V--Complete and Not Complete the Program for Registry in Occupational Therapy

The analysis of the data developed a prediction for the dichotomy of completing or not completing the program for registration in occupational therapy. As Shalik (1978) synthesized:

The method used for this analysis is the Wilk's lambda. The criterion was the overall multivariate F ratio for the test of differences among group centroids. The variable which maximized the F ratio also minimized Wilk's lambda, a measure of group discrimination. Group assignment was based on the distance from the centroid with the actual group assignment determined by the closest distance to one of the centroids. (p. 48)

Table 10 shows the classification functions.

This discriminant function correctly classified 66.7 percent of the subjects into the completion group and 33.3 percent were incorrectly classified. Correct classification into the non-completion group was

68.7 percent with an error of 31.3 percent. A total average for correct placement of the subjects was 68 percent. This is a very low percentage since the correct prediction by chance would be 93.5 percent, as illustrated in Table 11, the classification matrix. The "jackknifed classification" is a procedure of the cross validation type (see Table 12). The "jackknifed classification" table indicates again that the chance rate of correct classification was 92 percent while the actual correct classification rate was only 66 percent.

Table 10

Model V and VI--Classification Functions

Variable Group		=	Complete	Did Not Complete
Number	4 TRANS		-0.946	-2.443
	18 ENGLT		0.322	0.202
	20 PSYCH		0.207	0.334
	24 GPA-1		8.983	10.218

Table 11

Model V and VI--Classification Matrix

Group	Percent Correct	Number of Cases Classified into Group	
		Complete	Did Not Complete
Complete	66.7	14	7
Not Complete	68.2	47	101
Total	68.0	61	108

Table 12
Models V and VI--Jackknifed Classification

Group	Percent Correct	Number of Cases Complete	Classified into Group Did Not Complete
Complete	57.1	12	9
Not Complete	67.6	48	100
Total	66.3	60	109

The first significant variable entered was number 4, University of Florida freshman or transfer student (TRANS); second was the variable number 20, number of hours in psychology (PSYCH); third, number 24, GPA for the first two years of college (GPA-1); and fourth, number 18, number of hours in English and literature (ENGLT). These four variables are the same ones that entered into the multiple regression analysis for predicting scores in psychiatry internship.

Null hypotheses V and VI were both rejected since it was statistically possible to discriminate among groups of students, those who completed (V), and those who did not complete (VI) the occupational therapy program on the basis of linear combinations of objective variables used in this study.

The same basic equation applied to discriminant analysis as to multiple regression analysis:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4$$

$$V \text{ Complete} = 14.387 - .946X_1 \text{ (TRANS)} + .207X_2 \text{ (PSYCH)} + 8.983X_3 \text{ (GPA-1)} + .322X_4 \text{ (ENGLT)}$$

$$\begin{aligned} \text{VI No Complete} = & -16.47 - 2.443X_1 \text{ (TRANS)} + .334X_2 \text{ (PSYCH)} \\ & + 10.218X_3 \text{ (GPA-1)} + .202X_4 \text{ (ENGLT)} \end{aligned}$$

The reader can refer to Table 13 for a summary of variables entered by step for completion of the occupational therapy program. Table 14 shows the actual and predicted scores using a random sample of data.

Table 13

Models V and VI--Summary-Variables Entered by Step

Step Number	Variable Entered	F ratio	Overall F	Degrees of Freedom
1	TRANS	5.806	5.806	1 - 167
2	PSYCH	5.729	5.850	2 - 166
3	GPA-1	4.311	5.414	3 - 165
4	ENGLT	5.078	5.431	4 - 164

Table 14

Model V--Score Comparison for Completed-Actual and Predicted

Subject Number	Actual	TRANS	PSYCH	GPA-1	ENGLT	Predicted
007	1	1	16	2.7	08	28.637
051	1	0	10	1.97	16.6	25.112
111	1	1	14	1.44	08	17.464
149	1	0	09	2.61	09	28.207
155	0	0	04	2.09	28	28.618
165	0	0	9.5	3.0	32.1	39.252

Model VI--No completion of occupational therapy program is the other half of the dichotomy. Table 15 shows that this equation lacks usefulness when applied to a practical situation.

Table 15

Model VI--Score Comparison for Did Not Complete-
Actual and Predicted

Subject Number	Actual	TRANS	PSYCH	GPA-1	ENGLT	Predicted
007	1	1	16	2.7	08	15.636
051	1	0	10	1.97	16.6	10.352
111	1	1	14	1.44	08	2.093
149	1	0	09	2.61	09	15.023
155	0	0	04	2.09	28	11.878
165	0	0	9.5	3.0	32.1	23.841

Models VII and VIII--Working or Not Working in the
Field of Occupational Therapy

A prediction was developed for the dichotomy of working or not working in the field of occupational therapy four to eight years after graduation. Table 16 shows the classification functions. This discriminant function correctly classified 42.9 percent of the subjects into the working group and 57.1 percent were incorrectly classified. Correct classification into the non-working group was 71.7 percent with an error of 28.3 percent. The total average for correct classification of the subjects was 62.1 percent. This is again low since the correct prediction by chance would be 71.7 percent, as shown in Table 17, the classification matrix. The "jackknifed procedure" indicates a concurrence with these findings (see Table 18).

Table 16
Models VII and VIII--Classification Functions

Variable	Group =	Work	No Work	Overall <u>F</u>	Degrees of Freedom
#23 Music		.268	0.121	9.021	1 - 167
Constant		-1.093	-0.775		

Table 17
Models VII and VIII--Classification Matrix

Group	Percent Correct	Number of Cases Classified into Groups	
		Work	No Work
Work	42.9	24	32
No Work	71.7	32	81
Total	62.1	56	113

Table 18
Models VII and VIII--Jackknifed Classification

Group	Percent Correct	Number of Cases Classified into Group	
		Work	No Work
Work	42.9	24	32
No Work	71.7	32	81
Total	62.1	56	113

The first and only significant variable to enter was number 23, number of hours in music.

Null hypotheses VII and VIII were rejected since it was statistically possible to discriminate among groups of students (VII) those who are working and (VIII) those who are not working in the field of occupational therapy four to eight years after graduation on the basis of linear combinations of objective variables used in this study.

$$Y = a + bX$$

$$\text{Work} = 1.095 + .268 (\text{MUSIC})$$

$$\text{No Work} = -0.775 + .121 (\text{MUSIC})$$

Practical application shows the predictive weakness of this equation also.

Model VIII not working in the field of occupational therapy was the other half of the dichotomy. This again was not a practical equation, especially since there was only one variable that was statistically significant.

It was the intent of this study to develop a process model for use in selecting students who would complete the program in occupational therapy and remain working in the field. The process model could have been the combination of all the variables that proved to be significant for the different dependent variables. Since five of the variables were seen two or more times within the eight models, these could be considered more important. However, the amount of movement that could be accounted for was too small to be of practical use.

CHAPTER V

CONCLUSIONS, OBSERVATIONS AND RECOMMENDATIONS

Conclusions

The purpose of this study was to identify objective variables which might prove useful for selection of potential candidates for entry into a health related curriculum who would most likely be able to complete the academic requirements and meet the qualifications for registry in occupational therapy, enter the job market, and continue within the field of occupational therapy.

A study of the literature revealed that no study combined all of the following:

1. practical application data in the dependent and independent variables.
2. academic data in the dependent and independent variables.
3. a sample size larger than 50.
4. data on subjects for more than three successive years.
5. followup on the same subjects more than one year after graduation.
6. followup on the subjects who withdrew from the undergraduate curriculum.
7. use of only objective data from transcripts.

This study included all of the above on the same population.

The 169 subjects in this study all had been accepted into the curriculum for graduating classes in occupational therapy spanning the five year period from 1969 to 1973. Of the 160 women and nine men, 19 withdrew from the undergraduate curriculum. The 25 selected variables occurring prior to professional course work were taken from University of Florida transcripts. University of Florida transcripts were available for all subjects. These variables were used as probable factors explaining the movement of the dependent variables.

The study was executed in two statistical parts. The first part encompassed the objectives of finding the best pre-professional course work indicators for scores on the following:

1. Psychiatric Internship
2. Physical Disabilities Internship
3. National Registry Examination
4. Work Status Follow-up.

This part was designed to compute a stepwise multiple regression analysis using the Bio-Med BMDP2R statistical packaged program.

The four multivariate null hypotheses proposed for the multiple regression analysis were all statistically rejected.

It was not possible to predict scores for

- (I) the National Registry Examination
- (II) Psychiatry internship
- (III) Physical disabilities internship
- (IV) Work status

on the basis of multiple combinations of variables which include college entry test scores, courses taken, grade point averages, and other objective data taken from transcripts.

The second part used stepwise discriminant analysis to find the best indicators of completion and non-completion of the occupational therapy program and the best indicators for work persistence and non-persistence in the field of occupational therapy using Biomedical computer packaged program P-Series, BMDP7M.

The four multivariate null hypotheses proposed for the discriminant analysis were all statistically rejected.

It was not possible to discriminate among groups of students (V) those who completed and (VI) those who did not complete the occupational therapy program on the basis of linear combinations of variables which include college entry test scores, courses taken, grade point averages, and other objective data taken from transcripts.

It was not possible to discriminate among groups of students (VII) those who were working and (VIII) those who were not working in the field of occupational therapy four to eight years later on the basis of linear combinations of variables which include college entry test scores, courses taken, grade point averages, and other objective data taken from transcripts.

Results of the multiple regression analysis of the 25 variables showed five to be statistically significant at the .05 level: college entry test score, college grade point average for the first two years, transfer student or entry as a University of Florida freshman, number of credit hours in English and literature, number of credit hours in psychology. The discriminant analysis used all but one of the same variables (CEEBS) and added only one more: number of credit hours in music.

In each analysis the eight corresponding null hypotheses were rejected. Although statistically significant variables were revealed, they were not useful for practical application in selection because

1. they accounted for such a small amount of the movement of the dependent variables.
2. there were not enough significant variables to make a good model.
3. the sign of the regression coefficient did not always seem practical. A negative sign meant that selection of students would be based on lower scores or fewer hours in these variables.

All of the subjects in this study were part of a pre-selected group which obviously narrowed the range of variability and affected the results. This was demonstrated for each dependent variable by a random sample of subjects' actual data used in each predictive equation. The accuracy of the discriminant analysis was far less than might have occurred by chance.

An initial regression analysis on approximately 55 variables showed that better predictors could be identified that accounted for up to 50 percent of the movement of some of the dependent variables. However, the use of these variables was not rational in terms of when the data were available and when they were needed to make the selection of students. These more significant variables occurred after selection had been accomplished and were factors in the professional curriculum.

It was the intent of this study to develop a process model for use in selecting students who would complete the program in occupational therapy and remain working in the field. The process model could have been the combination of all the variables that proved to be significant for the different dependent variables. Table 19 shows all the independent variables used in the eight equations and the frequency of use.

Table 19
Frequency of Independent Variable Use

Variable	Frequency of Use in Eight Equations
College Entrance Examination Board Test Score	2
Number of credit hours in English and literature . . .	3
Transfer student or University of Florida freshman . .	3
Number of credit hours in psychology	2
College grade point average for the first two years . .	3
Number of credit hours in music	1

Since five of the variables were seen two or more times within the eight models, these could be considered more important. However, the

amount of movement that could be accounted for was too small to be of practical use.

The results of the study indicated that combining both academic and practical application parameters in both the independent and the dependent variables does not enhance the practical application of a predictive selection equation versus using just one of these parameters in both. It was found that the same five variables were statistically significant for both the academic and the practical application dependent variables. Implications of the study were that a few variables could be considered in the selection of potential candidates: college grade-point average for the first two years, transfer student or University of Florida freshman, number of credit hours in English and literature, College Entrance Examination Board Test score, number of credit hours in psychology, and number of credit hours in music. However, human factors and subjective data should also be included. In conclusion, this researcher found that a practical predictive equation for use in selecting potential health curriculum students cannot be developed with the objective data used in this study.

Observations

The dropout rate at the University of Florida undergraduate level in occupational therapy was small, only 11 percent, and persistence of graduates working in the field of occupational therapy was 75 percent four to eight years after graduation. Johnson (1978) said that 75 percent of occupational therapists quit working in their first five years of employment. However, Jantzen (1972) pointed out that

80 percent of all the qualified occupational therapists in the United States were working in the field of occupational therapy. This was only five percent more than was shown by this study. With these facts in mind, it seemed appropriate to say that the selection process for potential occupational therapy students at the University of Florida for the population of this study was doing its job well.

An employment rate of 75 to 80 percent was extremely good compared to the 60 percent in nursing as cited by Knopf (1979). Expectations for new graduates might be too high, considering that occupational therapy is mostly a female field with the typical therapist being married, aged 27, and having one or no children (Jantzen 1972). The time span of five to ten years after graduation was during the prime child bearing years. A study from the physical therapy literature shows an employment pattern similar to occupational therapy. Five years after graduation from a physical therapy curriculum did not show a higher percent (32 percent) of graduates employed than at one year after graduation (11 percent) (Cypres 1969).

Johnson (1978) pointed out that 63 percent of those therapists who drop out of employment within the first five years return after 20 years. A future study of work status 15 to 25 years after graduation might reveal more accurate information on persistence in employment of occupational therapists.

The literature showed that previous academic performance and achievement were the best indicators of later success in similar areas. This study concurred with these findings.

Other observations from this study include:

1. Transfer students from other colleges did not do as well as students who began at the University of Florida as freshmen.
2. Classes in other health fields were more of a hindrance than a help to success in the occupational therapy curriculum at the University of Florida.

Recommendations

Based on the findings of this study and the review of the literature, this researcher recommends the following:

1. Further research is needed in followup of students 15 to 25 years after graduation.
2. Further research is needed using all applicants to the specific curriculum and compare those who were accepted and those who were rejected in the following areas:
 - a. Different combinations of course categories should be tried in future research
 - b. Biographical data should be utilized more in future research
 - c. Use of measures of maturity should be considered in future research
3. Future attention should be given to the following variables in the development of a student selection procedure:
 - a. College grade point average for the first two years
 - b. Transfer student or entry as a University of Florida freshman.
 - c. Number of credit hours in English and literature.

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APPENDIX

Key to Abbreviations

WK/NWK	= working or not working in the field of occupational therapy four to eight years after graduation.
REGIST	= American Occupational Therapy National Registry Examination score.
PYCHIN	= Psychiatric Internship score.
PD INT	= Physical Disabilities Internship score
COMP P	= Completion or no completion of the educational program in occupational therapy
WK STA	= Work status score four to eight years after expected graduation.

Subject Number	#2 WK/NWK	#26 REGIST	#27 PYCHIN	#28 PD INT	#30 COMP P	#31 WK STA
1	0	172	223.0	228.0	1	08
2	1	200	229.5	267.0	1	10
3	1	175	226.5	288.0	1	10
4	0	195	264.0	233.0	1	08
5	0	188	224.0	216.5	1	08
6	1	163	277.5	244.5	1	10
7	1	186	262.0	256.0	1	10
8	1	175	297.5	298.0	1	10
9	1	170	265.5	253.0	1	10
10	1	213	269.5	262.0	1	10
11	1	207	275.5	281.5	1	10
12	1	190	275.5	221.5	1	10
13	1	181	243.5	239.0	1	10
14	0	201	213.0	192.5	1	09
15	1	174	244.5	221.5	1	10
16	1	187	273.5	279.5	1	10
17	1	177	244.5	296.0	1	10
18	1	201	236.5	241.0	1	10
19	1	206	270.0	229.0	1	10
20	1	205	269.0	249.5	1	10
21	1	174	275.5	286.0	1	10
22	1	207	291.5	283.5	1	09
23	1	173	280.5	251.5	1	10
24	0	188	276.0	258.0	1	08
25	1	187	272.5	199.0	1	10
26	1	194	242.0	222.0	1	09
27	1	174	228.0	234.5	1	10
28	1	159	238.0	230.5	1	10
29	0	189	275.0	209.0	1	08
30	0	194	294.5	256.5	1	08
31	1	157	225.5	275.5	1	09
32	1	177	219.0	291.0	1	10
33	0	175	253.0	244.0	1	08
34	0	179	281.5	264.0	0	08
35	1	188	259.0	267.0	1	10
36	1	187	261.5	230.0	1	10
37	0	183	249.0	206.0	1	08
38	1	171	242.0	229.0	1	09
39	0	191	273.0	277.0	1	09
40	1	164	297.0	265.5	1	10
41	1	182	281.5	266.0	1	10
42	0	160	Mean 255.0	198.0	1	07
43	1	162	245.0	141.0	1	10
44	1	191	251.0	230.0	1	10
45	1	158	232.5	295.0	1	10

Subject Number	#2 WK/NWK	#26 REGIST	#27 PYCHIN	#28 PD INT	#30 COMP P	#31 WK STA
46	1	164	151.5	281.0	1	09
47	1	200	245.0	217.0	1	10
48	0	164	270.0	228.0	1	08
49	1	180	262.5	266.0	1	10
50	1	Mean 172	184.0	149.0	1	10
51	1	158	254.0	270.5	1	10
52	1	149	228.5	226.0	1	10
53	0	172	231.0	231.0	1	08
54	1	137	203.5	232.0	1	10
55	0	193	233.0	254.0	1	08
56	0	163	269.0	205.0	1	08
57	0	183	272.0	283.0	1	08
58	0	177	239.0	270.5	1	08
59	0	165	237.0	272.0	1	08
60	1	151	285.0	300.0	1	10
61	1	172	Mean 255.0	287.0	1	10
62	1	150	274.0	282.0	1	10
63	1	165	289.0	267.0	1	10
64	1	146	246.0	175.0	1	10
65	1	159	222.0	243.0	1	10
66	1	169	273.0	242.0	1	10
67	1	144	281.0	289.0	1	09
68	1	161	249.0	218.0	1	10
69	1	181	269.0	224.0	1	10
70	0	166	246.5	236.0	1	08
71	1	160	Mean 255.0	Mean 247.0	1	09
72	1	145	256.0	234.5	1	10
73	0	154	231.0	196.0	1	05
74	1	175	232.0	284.0	1	09
75	1	173	269.0	269.0	1	10
76	0	165	264.0	238.5	1	08
77	0	164	226.0	290.0	1	08
78	1	150	242.5	233.0	1	10
79	1	184	256.0	285.5	1	10
80	1	178	169.0	180.0	1	10
81	1	197	276.5	164.5	1	10
82	1	149	274.0	267.0	1	10
83	1	147	283.0	280.0	1	10
84	0	138	269.5	166.5	1	04
85	1	163	255.5	263.0	1	10
86	1	141	274.0	284.5	2	10
87	0	178	206.5	274.0	1	10
88	0	179	288.5	245.5	1	08
89	0	000	148.5	203.0	1	00
90	-	154	Mean 255.0	276.5	1	08

Subject Number	#2 WK/NWK	#26 REGIST	#27 PYCHIN	#28 PD INT	#30 COMP P	#31 WK STA
91	1	155	273.5	277.5	1	10
92	1	167	256.0	272.0	1	09
93	0	150	210.0	189.0	1	04
94	1	162	224.0	207.0	1	10
95	1	175	279.0	250.0	1	10
96	1	172	274.5	277.0	1	10
97	1	178	279.5	277.0	1	10
98	0	173	276.0	200.0	1	08
99	0	163	230.0	211.5	1	04
100	1	176	253.0	270.0	1	10
101	1	164	Mean 255.0	219.5	1	10
102	1	144	268.0	201.0	1	10
103	1	180	251.0	267.0	1	10
104	1	166	294.5	278.0	1	10
105	1	170	300.0	280.0	1	10
106	1	180	285.0	280.5	1	09
107	1	194	284.0	266.0	1	10
108	1	168	267.0	218.5	1	10
109	1	177	239.0	194.0	1	10
110	1	183	242.0	284.0	1	10
111	1	155	186.0	144.0	1	10
112	1	157	279.0	229.5	1	10
113	1	174	231.0	298.0	1	10
114	1	187	243.0	280.5	1	10
115	1	174	283.0	268.0	1	10
116	1	151	238.0	155.0	1	10
117	1	143	279.0	280.0	1	10
118	1	159	292.5	233.0	1	10
119	1	165	208.0	292.5	1	10
120	1	201	291.0	290.0	1	10
121	0	171	250.0	265.0	1	08
122	0	183	246.0	213.0	1	08
123	1	188	265.0	265.0	1	10
124	1	144	245.0	238.5	1	10
125	1	167	220.5	248.0	1	10
126	1	180	289.0	243.5	1	10
127	1	189	253.5	212.0	1	10
128	1	160	288.0	292.5	1	10
129	0	166	237.5	194.5	1	06
130	1	161	236.0	219.0	1	10
131	1	168	287.0	284.5	1	10
132	1	168	202.0	236.5	1	10
133	1	197	275.5	251.5	1	10
134	1	164	289.0	260.0	1	10
135	1	179	274.0	299.0	1	10

Subject Number	#2 WK/NWK	#26 REGIST	#27 PYCHIN	#28 PD INT	#30 COMP P	#31 WK STA
136	1	189	291.0	282.0	1	10
137	1	174	255.5	240.5	1	10
138	0	000	244.5	237.0	0	02
139	1	150	233.0	288.5	1	10
140	1	188	232.0	218.0	1	09
141	1	162	262.5	280.5	1	10
142	0	159	235.0	285.0	1	05
143	1	184	166.5	244.0	1	10
144	1	167	267.0	247.0	1	09
145	1	148	237.0	248.0	1	10
146	0	169	257.0	169.0	1	06
147	1	151	260.5	151.0	1	10
148	1	190	219.0	190.0	1	09
149	1	174	236.0	174.0	1	10
150	0	-	-	-	0	02
151	0	-	-	-	0	02
152	0	-	-	-	0	00
153	1	197	265.0	255.0	1	09
154	-	-	-	-	0	00
155	0	-	-	-	0	03
156	0	-	-	-	0	01
157	0	-	-	-	0	02
158	0	-	-	-	0	01
159	0	-	-	-	0	00
160	0	-	-	-	0	01
161	0	-	-	-	0	00
162	0	-	-	-	0	00
163	0	-	-	-	0	00
164	0	-	-	-	0	00
165	0	-	-	-	0	03
166	0	-	-	-	0	02
167	0	-	-	-	0	00
168	0	-	-	-	0	03
169	0	-	-	-	0	02

BIOGRAPHICAL SKETCH

Carolyn Dockstader Stewart was born February 4, 1943, in El Paso, Texas. She attended numerous public schools all over the northwest and central United States, and graduated from Clinton High School, Clinton, Iowa, in 1961. She attended the University of Iowa and received the Bachelor of Science degree in occupational therapy in June 1965.

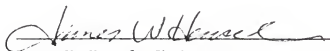
Upon graduation she worked as a staff therapist and assistant director of occupational therapy in several clinical settings from 1966 to 1972. In 1971 she entered graduate school on a parttime basis at the University of Florida. She received the Master of Education degree in March 1973 with a major in special education. In December of 1973 she received the Specialist in Education degree with a major in curriculum and instruction. Since that date she has been studying part-time toward the Doctor of Philosophy degree in curriculum and instruction.

While studying for the doctorate she has worked parttime as Assistant Professor of Education at the University of Montana, occupational therapy and educational consultant to the Comprehensive Developmental Clinic in Missoula, Montana, and special education consultant to the Missoula County high schools.

From her marriage to Keith C. Stewart, M.D., of Cedar Falls, Iowa, they have two sons, Chad and Dirk.

She is a member and a registered occupational therapist with the American Occupational Therapy Association since 1966.

I certify that I have read this study and in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.



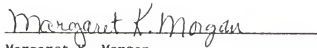
James W. Hensel, Chairman
Professor of Curriculum and Instruction

I certify that I have read this study and in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.



Lela A. Llorens
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I certify that I have read this study and in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.



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Associate Professor of Curriculum
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I certify that I have read this study and in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

A handwritten signature in dark ink, appearing to read "Myron A. Cunningham", is written over a horizontal line.

Myron A. Cunningham
Professor of Special Education

This dissertation was submitted to the Graduate Faculty of the Division of Curriculum and Instruction in the College of Education and to the Graduate Council, and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

December 1979

Dean, Graduate School

UNIVERSITY OF FLORIDA



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